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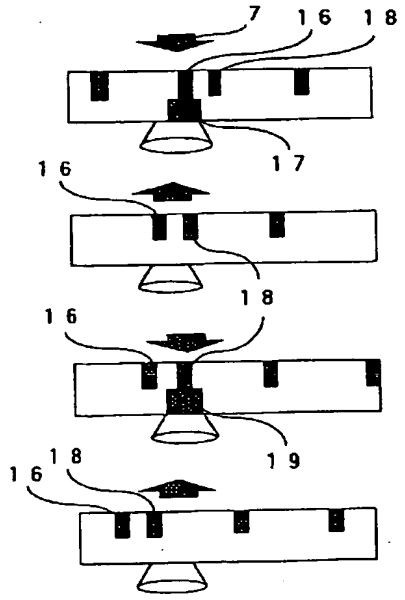
(54)【発明の名称】　光磁気記録媒体およびそれを用いた光磁気記録再生装置

(57)【要約】
【目的】　微小磁区を転写拡大または転写磁区の消去を行ない、微小磁区を高Ｓ／Ｎ、低再生クロストークで再生する。
【構成】　交換結合多層膜を用い再生時に磁界発生装置で再生磁界を交番させる。
【効果】　微小磁区の再生Ｓ／Ｎを大幅に向上させることができ、再生のクロストークを大幅に改善できる。

図１



1

【特許請求の範囲】
【請求項１】基板上に少なくとも第１誘電体膜、次に第１、第２、第３磁性層、さらに保護膜を順次積層した光磁気記録媒体において、上記第２磁性層は室温以上に補償温度を有する希土類遷移金属であり、上記第２磁性層のキュリー温度は微小磁区記録温度よりも低いことを特徴とする光磁気記録媒体。
【請求項２】上記第３磁性層は希土類遷移金属合金からなり、全体の磁気モーメントが希土類の磁気モーメントと室温において同一方向を向いていることを特徴とする請求項１記載の光磁気記録媒体。
【請求項３】基板上に少なくとも第１誘電体膜、次に第１、第２、第３磁性層、さらに保護膜を順次積層した光磁気記録媒体を用い、該第１磁性層の側からレーザ光を照射し、その反射光が磁気光学効果を受けることを利用して、情報を再生する装置において、基板側に情報再生手段を、膜側に磁界発生手段を配置し、再生時に磁界および／または再生光を変調して再生する手段を有することを特徴とする光磁気記録再生装置。
【請求項４】１つの記録ドメインを再生する際に正負の磁界を交番させて再生することを特徴とする請求項３記載の光磁気記録再生装置。
【請求項５】１つの記録ドメインを再生する際に正負の磁界を交番させて再生した信号を微分検出することを特徴とする請求項３記載の光磁気記録再生装置。
【発明の詳細な説明】
【０００１】
【産業上の利用分野】本発明は、光および／または磁界を変調して記録再生する光磁気記録媒体およびそれを用いた光磁気記録再生装置に関する。
【０００２】
【従来の技術】光磁気記録は、情報の記録・再生・消去が可能な光記録である。現在利用されている光磁気ディスクの記録再生は光のスポット径に制限されている。このスポット径の半分以下の微小磁区を再生するにはバーシャルレスポンスや磁気的超解像、あるいは光学的超解像、２次元情報のクロストークキャンセルなど様々な方法が考えられている。しかし、どの方法も微小磁区を光スポットの分解能を上げて再生する方法であり、本質的に信号量を改善する方法にはなっていない。
【０００３】
【発明が解決しようとする課題】本発明の課題は上記微小磁区の再生信号量を本質的に改善することにある。
【０００４】
【課題を解決するための手段】上記課題は、記録膜に交換結合３層磁性膜を用いたディスクにおいて、光スポット内で加熱され保磁力の低下した再生層に記録層の磁区を転写し、これを再生磁界により拡大することで解決される。例えば、図１に示したように（１）再生スポット内に記録磁区１６があり、拡大磁界７を記録再生磁界発

2

生装置により発生させ転写拡大磁区１７が現われ、信号が増大する。次に隣接磁区１８を再生するため磁界７を消去方向に切り替える。（２）のように転写拡大磁区１７は消滅し、再生信号は０となる。再び記録磁区１８を再生するために磁界７を（３）のように反転させると、転写拡大磁区１９が現われる。（４）のように再び磁界が反転すると転写拡大磁区は消滅する。記録膜の磁化の状態が変化する様子を図２から８まで示した。磁化状態は白矢印が全体の磁気モーメント、黒矢印は遷移金属の磁気モーメントを示す。着磁後は図２のような磁化状態となる。これを初期化磁石を通過すると図３のような磁化状態になり、記録磁区は基板側から見えない。レーザー光を照射し、転写磁界７を与えると記録磁区が転写される。（図５）さらに磁界７を図６のように大きくすると磁性層２、３の磁区だけが保磁力が小さいため拡大し、大きな再生信号が得られる。次の磁区を読むためにはこれを消す必要がある。以上の内容は再生光をパルス状にすることでよりＳ／Ｎを高めることができる。これは図７のように先ほどと逆方向に磁界７を与えることで転写磁区は縮小し、さらに磁界を大きくすると図８のように消去が完成する。図９には装置の構成図を示した。第３磁性膜としては微小磁区記録の安定性の優れた希土類遷移金属合金が好ましい。特に室温において希土類金属の磁気モーメントが優先的な組成が好ましい。
【０００５】拡大した磁区が広がり過ぎて消去できなくならないようにするためには、中間層の補償温度を再生光スポット中心温度よりも適度に低く設定しておけば良い。また、再生磁界強度は再生時の光スポット中心温度付近での再生層の磁壁抗磁力以上保磁力以下にしておく必要がある。また、このような微小磁区の拡大による信号量改善作以外にこの信号量変化を微分信号にして検出する方法もある。また、微小磁区を記録するためには第２磁性層のキュリー温度を微小磁区記録温度よりも低く設定しておく必要がある。
【０００６】
【作用】上記手段により、信号対雑音比Ｓ／Ｎは大幅改善する。また、隣接磁区の再生クロストークも大幅改善するためトラック密度、マークピッチ共に詰めることができるため高密度記録が可能になる。
【０００７】
【実施例】
（実施例１）試料は、スパッタ法により作成した。作成条件は以下の通りである。到達真空度５Ｘ１０$^{-7}$Ｔｏｒｒ以下，スパッタガスにはＡｒを用いガス圧は５ｍＴｏｒｒ，投入電力は５００Ｗ，スパッタリングレートは０．１～０．２ｎｍ／ｓｅｃである。誘電体膜には窒化物を用い、第１磁性層にはキュリー温度３５０度、補償温度が室温以下のＧｄＴｂＦｅＣｏ合金を４０ｎｍ、第２磁性層にはキュリー温度１２０度，補償温度６０度のＧｄＤｙＦｅ合金を２０ｎｍ積層した。第３磁性層とし

ては補償温度１７０度、キュリー温度２４０度のＴｂＦｅＣｏを４０ｎｍ積層した。基板にはトラックピッチ１．６μｍのサンプルサーボ基板を用いた。

【０００８】記録に用いた変調磁界は２０００ｅで、ディスクの線速度は２．１ｍ／ｓｅｃとした。変調周波数２．５ＭＨｚで記録した磁区をサンプルクロックでタイミングをとって光パルスと磁界を５ＭＨｚで変調することにより再生を行なった。再生磁界は約１０００ｅで記録磁区だけが転写拡大され、再生磁界を約１５００ｅにすると再生層全体が反転した。また、再生磁界を約－１０００ｅ印加すると再生磁区が消去された。再生は波長は６８０ｎｍで行い、再生光と磁界を変調することでこれを行なわない場合に比べてＳ／Ｎに３ｄＢの改善が見られた。また、この信号変化を微分回路を通して再生したところさらにＳ／Ｎが１ｄＢ改善した。

【０００９】

【発明の効果】本発明によれば、光と磁界を変調して記録信号を再生すると微小磁区を拡大して信号量を本質的に増加させることが出きるため、大幅な信号対雑音比の改善が可能になり、また、再生後瞬時に拡大した磁区を消去できるので再生のクロストークも大幅に改善できる。

【図面の簡単な説明】

【図１】図１は本発明の磁界変調再生の原理図。

＊【図２】図２は着磁後の磁化の状態図。

【図３】図３は記録後の磁化の状態図。

【図４】図４は初期化磁石を通過したあとの磁化の状態図。

【図５】図５は再生時記録磁区を転写したときの磁化の状態図。

【図６】図６は再生時転写した磁区を拡大したときの磁化の状態図。

【図７】図７は再生時に転写した磁区を消去するときの磁化の状態図。

【図８】図８は再生時に転写磁区を完全に消去したときの磁化の状態図。

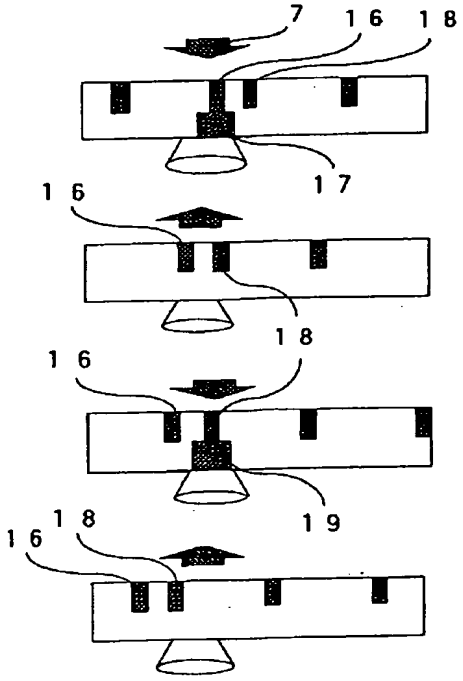
【図９】図９は光磁界変調光磁気記録再生装置の構成図。

【符号の説明】

１…保護膜、２…第３磁性膜、３…第２磁性膜、４…第１磁性膜、５…誘電体膜、６…基板、７…記録再生磁界発生装置による磁界、８…初期化磁界、９…光磁気ディスク、１０…浮上磁気ヘッド、１１…浮上磁気ヘッド駆動装置、１２…記録再生制御装置、１３…光学ヘッド、１４…スピンドルモーター、１５…初期化磁石、１６…転写拡大して再生している磁区、１７…転写拡大して再生している磁区、１８…隣接磁区、１９…転写拡大して再生している磁区。

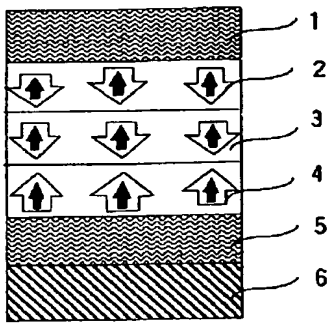
【図１】

図１



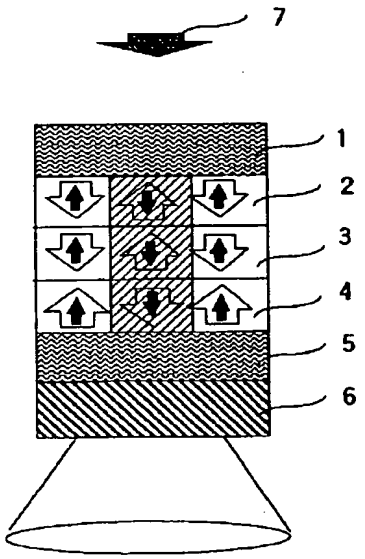
【図２】

図２



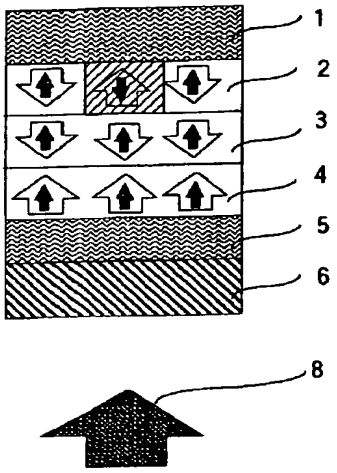
【図３】

図３



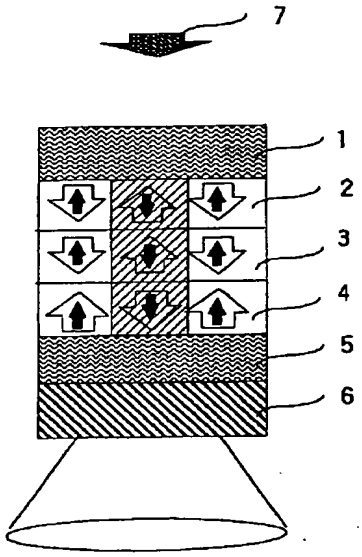
【図４】

図４



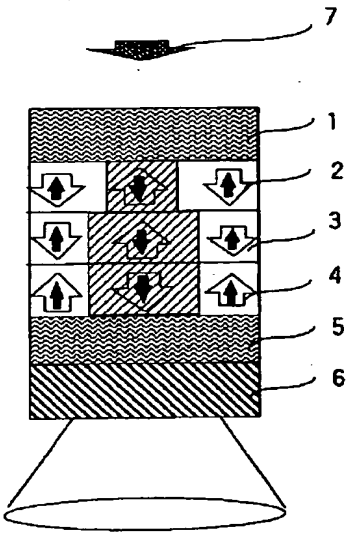
【図５】

図５



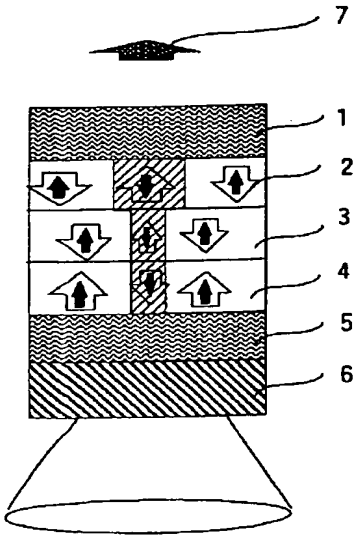
【図６】

図６



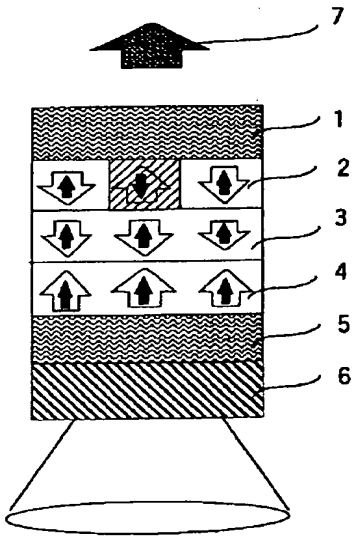
【図７】

図７



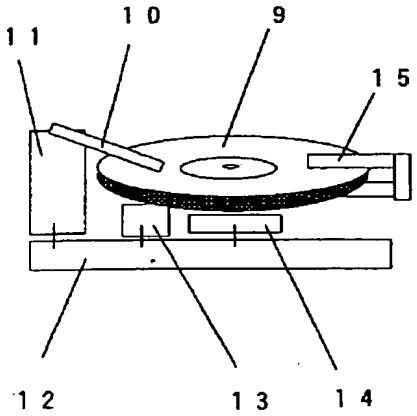
【図８】

図８



【図９】

図９



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【手続補正書】
【提出日】平成１２年８月７日（２０００．８．７）
【手続補正１】
【補正対象書類名】明細書
【補正対象項目名】発明の名称
【補正方法】変更
【補正内容】
【発明の名称】　光磁気記録媒体の再生方法、光磁気記録媒体およびそれを用いた光磁気記録再生装置
【手続補正２】
【補正対象書類名】明細書
【補正対象項目名】特許請求の範囲
【補正方法】変更
【補正内容】
【特許請求の範囲】
【請求項１】基板上に少なくとも記録層と再生層を備える光磁気記録媒体に光を照射して再生層の信号を検出することにより情報を再生する光磁気記録媒体の再生方法において、上記光の照射により上記再生層の保持力を下げて上記記録層の磁区を上記再生層に転写し、磁界を印加して上記再生層に転写した磁区を拡大した後、縮小することを特徴とする光磁気記録媒体の再生方法。
【請求項２】上記転写磁区の拡大および縮小を上記光のスポット内で行うことを特徴とする請求項１に記載の光磁気記録媒体の再生方法。
【請求項３】さらに、磁区を拡大する際に印加する磁界が記録磁区と同じ方向であることを特徴とする請求項２に記載の光磁気記録媒体の再生方法。
【請求項４】さらに、上記再生層で拡大した磁区を縮小する際に記録磁区と逆方向の磁界を印加することを特徴とする請求項３に記載の光磁気記録媒体の再生方法。
【請求項５】さらに、上記再生信号を微分検出することを特徴とする請求項１～４に記載の光磁気記録媒体の再生方法。
【請求項６】基板上に少なくとも第１誘電体膜、次に第１、第２、第３磁性層、さらに保護膜を順次積層した光磁気記録媒体において、上記第１磁性層は再生光の照射により上記第３磁性層の磁区を転写し、上記第２磁性層は室温以上に補償温度を有する希土類遷移金属であり、且つ、キュリー温度が微小磁区記録温度よりも低いことを特徴とする光磁気記録媒体。
【請求項７】さらに、上記第１磁性層は全体の磁気モーメントが遷移金属の磁気モーメントと室温において同一方向を向いている希土類遷移金属合金からなることを特徴とする請求項６に記載の光磁気記録媒体。
【請求項８】さらに、上記第３磁性層は希土類遷移金属合金からなり、全体の磁気モーメントが希土類の磁気モーメントと室温において同一方向を向いていることを特徴とする請求項７記載の光磁気記録媒体。
【請求項９】基板上に少なくとも第１誘電体膜、次に第１、第２、第３磁性層、さらに保護膜を順次積層した光磁気記録媒体を用い、該第１磁性層の側からレーザ光を照射し、その反射光が磁気光学効果を受けることを利用して、情報を再生する装置において、基板側に情報再生手段を、膜側に磁界発生手段を配置し、再生時に磁界および／または再生光を変調して再生する手段を有することを特徴とする光磁気記録再生装置。
【請求項１０】さらに、上記レーザ光はパルス状であることを特徴とする請求項９に記載の光磁気記録再生装置。
【請求項１１】１つの記録ドメインを再生する際に正負の磁界を交番させて再生することを特徴とする請求項９記載の光磁気記録再生装置。
【請求項１２】１つの記録ドメインを再生する際に正負の磁界を交番させて再生した信号を微分検出することを特徴とする請求項９記載の光磁気記録再生装置。
【手続補正３】
【補正対象書類名】明細書
【補正対象項目名】０００１

【補正方法】変更
【補正内容】
【０００１】

【産業上の利用分野】本発明は、光および／または磁界を変調して記録再生する光磁気記録媒体とその再生方法、およびそれを用いた光磁気記録再生装置に関する。

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-007350
(43)Date of publication of application : 12.01.1996

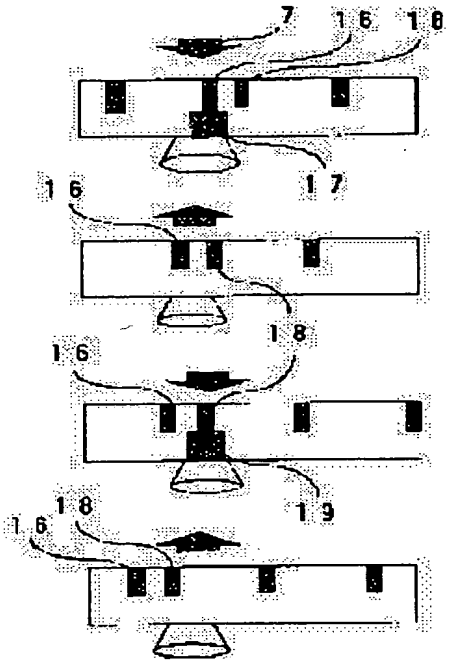
(51)Int.Cl. G11B 11/10
G11B 11/10

(21)Application number : 06-142867
(22)Date of filing : 24.06.1994

(71)Applicant : HITACHI LTD
HITACHI MAXELL LTD
(72)Inventor : AWANO HIROYUKI

(54) MAGNETO-OPTICAL RECORDING MEDIUM AND MAGNETO-OPTICAL RECORDING AND REPRODUCING APPARATUS

(57)Abstract:
PURPOSE: To essentially improve amount of reproduced signal of a fine magnetic domain by transferring a magnetic domain of a recording layer to a reproducing layer where a coercive force is lowered because the layer is heated within an optical spot and then enlarging such magnetic domain with the reproduced magnetic field.
CONSTITUTION: A recording magnetic domain 16 exists within a reproduced spot, a transferred and enlarged magnetic domain 17 appears when the enlarged magnetic field 7 is generated by a recording and reproduced magnetic field generator and thereby a signal is increased. Next, the magnetic field 7 is changed to the deleting direction to reproduce the adjacent magnetic domain 18. Thereby, the magnetic domain 17 disappears and the reproduced signal becomes zero. When the magnetic field is inverted to reproduce again the recording magnetic domain 18, the transferred enlarged magnetic domain 19 appears. When the magnetic field 7 is inverted again, the transferred and enlarged magnetic domain disappears. The compensating temperature of the intermediate layer is adequately set lower than the temperature at the center thereof to prevent that the enlarged magnetic domain is too widened to be deleted. Moreover, intensity of reproduced magnetic field must be set higher than the anti-magnetic force of magnetic wall but is lower than the coercive force of the reproducing layer at the temperature near the center temperature.



LEGAL STATUS

[Date of request for examination] 07.08.2000
[Date of sending the examiner's decision of rejection]
[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]
[Date of final disposal for application]
[Patent number] 3380621

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 08-007350

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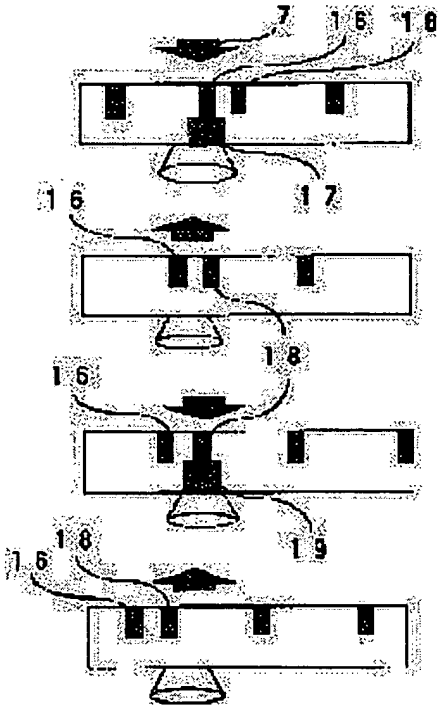
CONSTITUTION: A recording magnetic domain 16 exists within a reproduced spot, a transferred and enlarged magnetic domain 17 appears when the enlarged magnetic field 7 is generated by a recording and reproduced magnetic field generator and thereby a signal is increased. Next, the magnetic field 7 is changed to the deleting direction to reproduce the adjacent magnetic domain 18. Thereby, the magnetic domain 17 disappears and the reproduced signal becomes zero. When the magnetic field is inverted to reproduce again the recording magnetic domain 18, the transferred enlarged magnetic domain 19 appears. When the magnetic field 7 is inverted again, the transferred and enlarged magnetic domain disappears. The compensating temperature of the intermediate layer is adequately set lower than the temperature at the center thereof to prevent that the enlarged magnetic domain is too widened to be deleted. Moreover, intensity of reproduced magnetic field must be set higher than the anti-magnetic force of magnetic wall but is lower than the coercive force of the reproducing layer at the temperature near the center temperature.



LEGAL STATUS

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[Date of final disposal for application]	
[Patent number]	3380621
[Date of registration]	13.12.2002
[Number of appeal against examiner's decision of	

* NOTICES *

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3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] It is the magneto-optic-recording medium characterized by setting to the 1st dielectric film on a substrate, setting next at least to the 1st, the 2nd, and the magneto-optic-recording medium that carried out the laminating of the protective coat one by one further the 3rd magnetic layer, for the 2nd magnetic layer of the above being rare earth transition metals which have compensation temperature beyond a room temperature, and the Curie temperature of the 2nd magnetic layer of the above being lower than minute magnetic-domain record temperature.
[Claim 2] The 3rd magnetic layer of the above is a magneto-optic-recording medium according to claim 1 characterized by having consisted of a rare earth transition-metals alloy, and the whole magnetic moment having turned to the same direction in the magnetic moment and the room temperature of rare earth.
[Claim 3] Use the 1st dielectric film on a substrate, use the 1st, the 2nd, and the magneto-optic-recording medium that carried out the laminating of the protective coat one by one further the 3rd magnetic layer next at least, irradiate a laser beam from this 1st magnetic layer side, and it uses that the reflected light receives the magneto-optical effect. The magneto-optic-recording regenerative apparatus characterized by having a means to arrange an information playback means to a substrate side, and to arrange a field generating means to a film side, and to modulate a field and/or playback light and to reproduce in the equipment which reproduces information at the time of playback.
[Claim 4] The magneto-optic-recording regenerative apparatus according to claim 3 characterized by carrying out alternation of the field of positive/negative and reproducing in case one record domain is reproduced.
[Claim 5] The magneto-optic-recording regenerative apparatus according to claim 3 characterized by carrying out differential detection of the signal which was made to carry out alternation of the field of positive/negative, and was reproduced when reproducing one record domain.

[Translation done.]

* NOTICES *

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the magneto-optic-recording regenerative apparatus using the magneto-optic-recording medium and it which modulate light and/or a field and carry out record playback.
[0002]
[Description of the Prior Art] A magneto-optic recording is optical recording in which informational record, playback, and elimination are possible. Record playback of the magneto-optic disk used now is restricted to the diameter of a spot of light. Reproducing the minute magnetic domain below one half of this diameter of a spot considers various approaches, such as cross talk cancellation of partial response, magnetic super resolution or optical super resolution, and two-dimensional information. However, every approach is the approach of raising the resolution of an optical spot and reproducing a minute magnetic domain, and is not the approach of essentially improving the amount of signals.
[0003]
[Problem(s) to be Solved by the Invention] The technical problem of this invention is to essentially improve the amount of regenerative signals of the above-mentioned minute magnetic domain.
[0004]
[Means for Solving the Problem] In the disk which used the three layer magnetic film of switched connection for record film, the above-mentioned technical problem imprints the magnetic domain of a record layer in the playback layer to which it was heated within the optical spot and coercive force fell, and is solved by expanding this by the playback field. For example, as shown in drawing 1 , the record magnetic domain 16 is in (1) playback spot, the expansion field 7 is generated with a record playback field generator, the imprint expansion magnetic domain 17 appears, and a signal increases. Next, in order to reproduce the contiguity magnetic domain 18, a field 7 is changed in the elimination direction. As shown in (2), the imprint expansion magnetic domain 17 disappears and a regenerative signal is set to 0. If a field 7 is reversed as shown in (3) in order to reproduce the record magnetic domain 18 again, the imprint expansion magnetic domain 19 will appear. If a field is reversed again as shown in (4), an imprint expansion magnetic domain will disappear. Signs that the condition of magnetization of record film changed were shown from drawing 2 to 8. As for a magnetization condition, a white arrow head shows the magnetic moment of transition metals, as for the whole magnetic moment and a black arrow head. After magnetization will be in a magnetization condition like drawing 2 . In this, if an initialization magnet is passed, it will be in a magnetization condition like drawing 3 , and a record magnetic domain is not visible from a substrate side. If laser light is irradiated and the imprint field 7 is given, a record magnetic domain will be imprinted. (Drawing 5) If a field 7 is further enlarged like drawing 6 , since only the magnetic domain of coercive force of magnetic layers 2 and 3 is small, it will expand, and a big regenerative signal will be acquired. In order to read the following magnetic domain, it is necessary to erase this. The above contents can raise S/N more by making playback light into the shape of a pulse. An imprint magnetic domain is reduced because this gives a field 7 like the point to hard flow like drawing 7 , and if a field is enlarged further, elimination will be completed like drawing 8 . The block diagram of equipment was shown in drawing 9 . The rare earth transition-metals alloy which was excellent in the stability of minute magnetic-domain record as the 3rd magnetic film is desirable. In especially a room temperature, the presentation with the preferential magnetic moment of a rare earth metal is desirable.
[0005] What is necessary is just to set up an interlayer's compensation temperature low moderately rather than playback light spot core temperature, in order for the expanded magnetic domain to spread too much and for it not to become impossible to make it not eliminate. Moreover, it is necessary to make playback magnetic field strength below into coercive force beyond the magnetic domain wall coercive force of the playback layer near the optical spot core temperature at the time of playback. Moreover, there is also a method of making this amount change of signals into a

differential signal, and detecting it in addition to signal ******** by expansion of such a minute magnetic domain. Moreover, in order to record a minute magnetic domain, it is necessary to set up the Curie temperature of the 2nd magnetic layer lower than minute magnetic-domain record temperature.
[0006]
[Function] With the above-mentioned means, the extensive improvement of the signal-to-noise-ratio S/N is carried out. Moreover, since the extensive improvement also of the playback cross talk of a contiguity magnetic domain is carried out and track density and a mark pitch can be packed, high density record is attained.
[0007]
[Example]
(Example 1) The sample was created by the spatter. The creation conditions are as follows. Gas pressure is [500W and the sputtering rate of 5mTorr(s) and injection power] 0.1 - 0.2 nm/sec, using Ar in 5X10 to 7 or less Torrs of ultimate vacuums, and sputtering gas. Using the nitride, 350 Curie temperature and compensation temperature made the GdTbFeCo alloy below a room temperature the 1st magnetic layer, and made 20nm laminating of the GdDyFe alloy of 120 Curie temperature and 60 compensation temperature to 40nm and the 2nd magnetic layer at the dielectric film. As the 3rd magnetic layer, 40nm laminating of the TbFeCo of 170 compensation temperature and 240 Curie temperature was carried out. The track pitch 1.6micrometer sample servo substrate was used for the substrate.
[0008] The modulation fields used for record are 200Oe(s), and linear velocity of a disk was made into 2.1 m/sec. It reproduced by taking timing for the magnetic domain recorded with the modulation frequency of 2.5MHz with a sample clock, and modulating a light pulse and a field by 5MHz. When imprint expansion only of the record magnetic domain was carried out by about 100 Oe(s) and the playback field was set to about 150 Oe(s), the whole playback layer reversed the playback field. Moreover, when abbreviation-100Oe impression of the playback field was carried out, the playback magnetic domain was eliminated. Wavelength performed playback by 680nm and the 3dB improvement was found by S/N compared with the case where this is not performed, in modulating playback light and a field. Moreover, when it reproduced through the differential circuit, S/N has improved 1dB of this signal change further.
[0009]
[Effect of the Invention] Since according to this invention it will have come out to expand a minute magnetic domain and to make the amount of signals essentially increase if light and a field are modulated and a record signal is reproduced, and the magnetic domain which the improvement of a large signal-to-noise ratio was attained, and was expanded to the instant after playback is eliminable, a reproductive cross talk is also sharply improvable.

[Translation done.]

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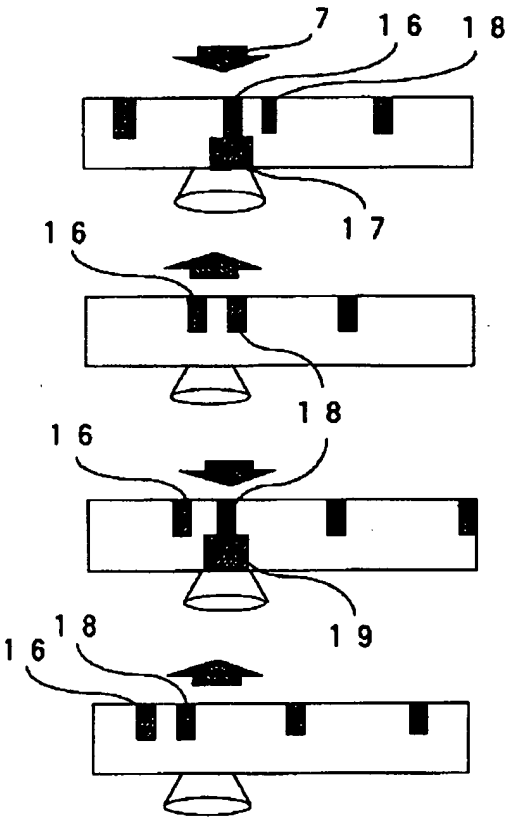
DRAWINGS

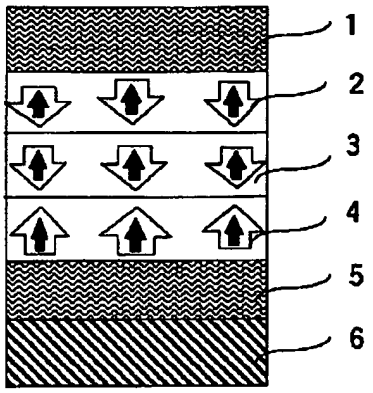
[Drawing 1]

図1



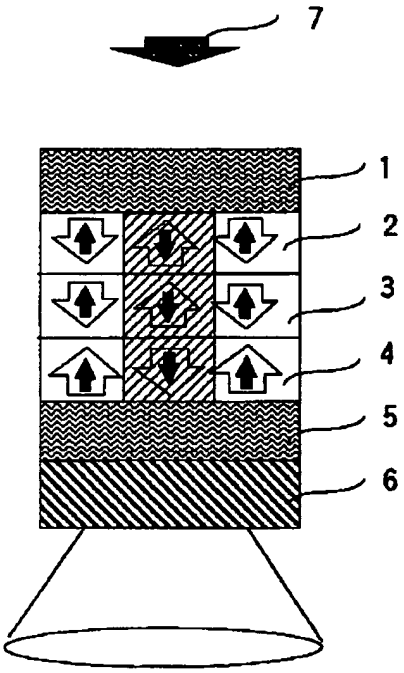
[Drawing 2]

図 2



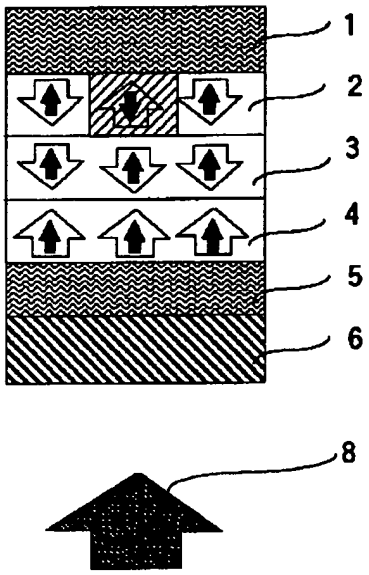
[Drawing 3]

図 3



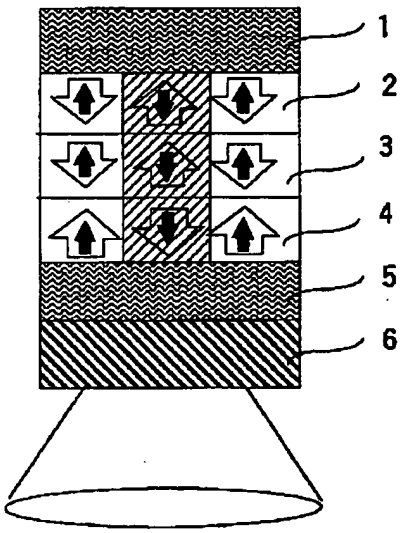
[Drawing 4]

図 4



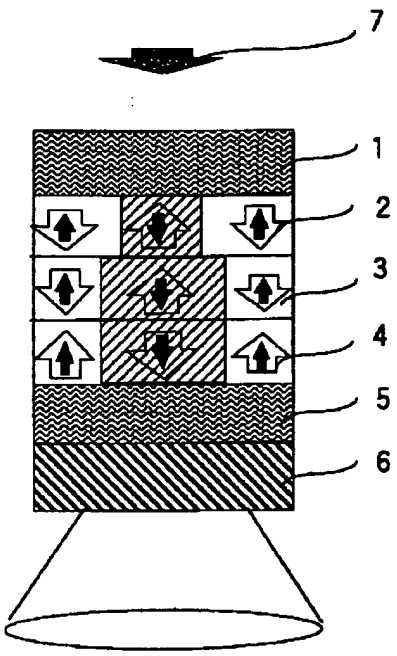
[Drawing 5]

図 5



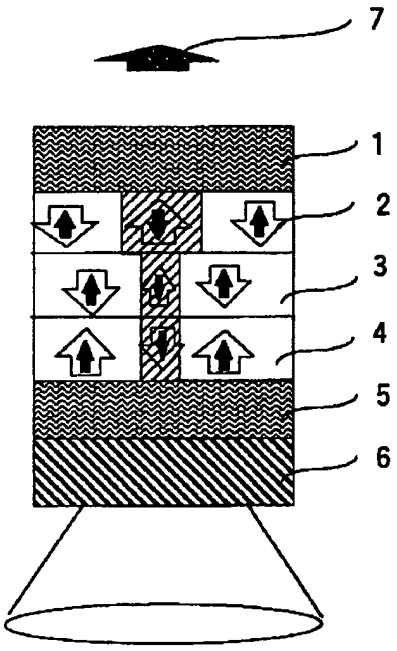
[Drawing 6]

図 6



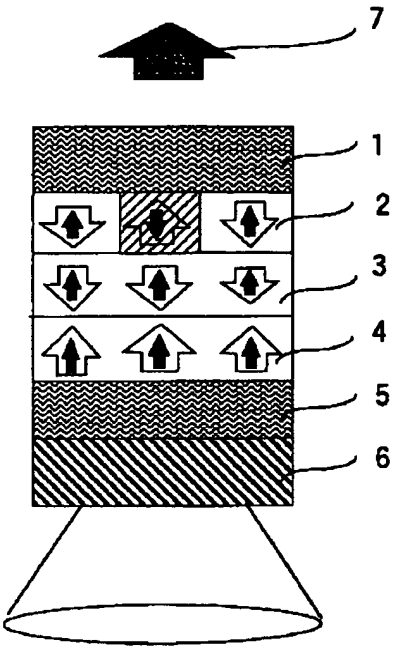
[Drawing 7]

図 7



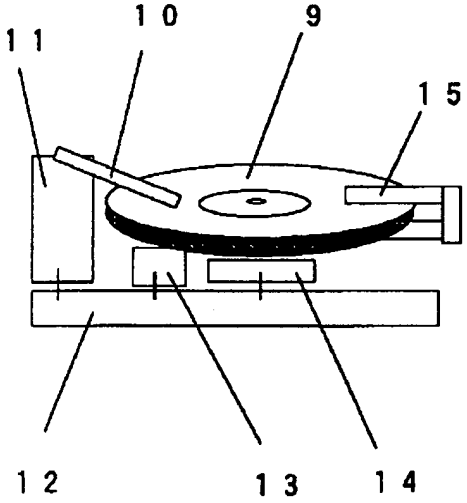
[Drawing 8]

図 8



[Drawing 9]

図 9



[Translation done.]

* NOTICES *

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
[Section partition] The 4th partition of the 6th section
[Publication date] July 27, Heisei 13 (2001. 7.27)

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[Date of Publication] January 12, Heisei 8 (1996. 1.12)
[Annual volume number] Open patent official report 8-74
[Application number] Japanese Patent Application No. 6-142867
[The 7th edition of International Patent Classification]

G11B 11/10 506
586

[FI]

G11B 11/10 506 A
586 C

[Procedure revision]
[Filing Date] August 7, Heisei 12 (2000. 8.7)
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] The name of invention
[Method of Amendment] Modification
[Proposed Amendment]
[Title of the Invention] The playback approach of a magneto-optic-recording medium, a magneto-optic-recording medium, and the magneto-optic-recording regenerative apparatus using it
[Procedure amendment 2]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] In the playback approach of the magneto-optic-recording medium which reproduces information by irradiating light at the magneto-optic-recording medium equipped with a record layer and a playback layer at least on a substrate, and detecting the signal of a playback layer The playback approach of the magneto-optic-recording medium characterized by reducing after expanding the magnetic domain which lowered the holding power of the above-mentioned playback layer by the exposure of the above-mentioned light, imprinted the magnetic domain of the above-mentioned record layer in the above-mentioned playback layer, impressed the field and was imprinted in the above-mentioned playback layer.
[Claim 2] The playback approach of the magneto-optic-recording medium according to claim 1 characterized by performing expansion and contraction of the above-mentioned imprint magnetic domain within the spot of the above-mentioned light.

[Claim 3] Furthermore, the playback approach of the magneto-optic-recording medium according to claim 2 characterized by the field impressed in case a magnetic domain is expanded being the same direction as a record magnetic domain.
[Claim 4] Furthermore, the playback approach of the magneto-optic-recording medium according to claim 3 characterized by impressing the field of a record magnetic domain and hard flow in case the magnetic domain expanded in the above-mentioned playback layer is reduced.
[Claim 5] Furthermore, the playback approach of the magneto-optic-recording medium according to claim 1 to 4 characterized by carrying out differential detection of the above-mentioned regenerative signal.
[Claim 6] It is the magneto-optic-recording medium which it sets to the 1st dielectric film on a substrate, sets next at least to the 1st, the 2nd, and the magneto-optic-recording medium that carried out the laminating of the protective coat one by one further the 3rd magnetic layer, and the 1st magnetic layer of the above imprints the magnetic domain of the 3rd magnetic layer of the above by the exposure of playback light, and the 2nd magnetic layer of the above is rare earth transition metals which have compensation temperature beyond a room temperature, and is characterized by Curie temperature being lower than minute magnetic-domain record temperature.
[Claim 7] Furthermore, the 1st magnetic layer of the above is a magneto-optic-recording medium according to claim 6 characterized by the whole magnetic moment consisting of a rare earth transition-metals alloy which has turned to the same direction in the magnetic moment and the room temperature of transition metals.
[Claim 8] Furthermore, the 3rd magnetic layer of the above is a magneto-optic-recording medium according to claim 7 characterized by having consisted of a rare earth transition-metals alloy, and the whole magnetic moment having turned to the same direction in the magnetic moment and the room temperature of rare earth.
[Claim 9] Use the 1st dielectric film on a substrate, use the 1st, the 2nd, and the magneto-optic-recording medium that carried out the laminating of the protective coat one by one further the 3rd magnetic layer next at least, irradiate a laser beam from this 1st magnetic layer side, and it uses that the reflected light receives the magneto-optical effect. The magneto-optic-recording regenerative apparatus characterized by having a means to arrange an information playback means to a substrate side, and to arrange a field generating means to a film side, and to modulate a field and/or playback light and to reproduce in the equipment which reproduces information at the time of playback.
[Claim 10] Furthermore, the above-mentioned laser beam is a magneto-optic-recording regenerative apparatus according to claim 9 characterized by being a pulse-like.
[Claim 11] The magneto-optic-recording regenerative apparatus according to claim 9 characterized by carrying out alternation of the field of positive/negative and reproducing in case one record domain is reproduced.
[Claim 12] The magneto-optic-recording regenerative apparatus according to claim 9 characterized by carrying out differential detection of the signal which was made to carry out alternation of the field of positive/negative, and was reproduced when reproducing one record domain.
[Procedure amendment 3]
[Document to be Amended] Specification
[Item(s) to be Amended] 0001
[Method of Amendment] Modification
[Proposed Amendment]
[0001]
[Industrial Application] This invention relates to the magneto-optic-recording medium which modulates light and/or a field and carries out record playback, its playback approach, and the magneto-optic-recording regenerative apparatus using it.

[Translation done.]